

Evaluation of attitudes and knowledge of anesthesiologists about regional anesthesia methods in ophthalmic surgery: A national survey study

Regional anesthesia in ophthalmic surgery

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Abstract

Aim: The use of regional techniques in ophthalmic surgery is becoming increasingly important. Worldwide, these techniques are usually performed by ophthalmologists, while the perioperative care of patients is provided by anesthesiologists. Therefore, good communication between the surgeon and the anesthesiologist is necessary for the careful management of all techniques used in ophthalmic surgery. In this study, the willingness of anesthesiologists to assume responsibility in the use of regional techniques and their knowledge of ophthalmic nerve blocks were assessed in a national survey.

Material and Methods: A total of 23 questions were asked to assess attitudes and knowledge about regional anesthesia procedures in ophthalmic surgery, and participants had three weeks to complete the Web-based questionnaire. Complete responses from 126 physicians were analyzed.

Results: 60% of participants work in university hospitals as faculty members. Although 54.8% of participants had worked in ophthalmic surgery for 3 months or more, and 76% reported that they had not attended any lectures or seminars on regional block use in ophthalmic surgery. When asked who applied blocks in ophthalmic surgery, 95% of the participants answered the surgical team.

Discussion: The lack of theoretical and practical knowledge about ophthalmic nerve blocks is striking even among the group of physicians who practice regional anesthesia. Even if regional techniques are performed by the surgeon himself, the anesthesiologist's responsibility in perioperative patient care cannot be ignored. For this reason, the level of knowledge of anesthesiologists on this topic should be increased through various continuing education courses.

Keywords

Multimodal Pain Management, Ophthalmic Surgery, Regional Anesthesia, Retrobulbar Block, Ophthalmic Block

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Introduction

Ophthalmic surgery is one of the most common surgical procedures requiring anesthesia in developed countries. Good communication between ophthalmologist and anesthesiologist is required at all times for the careful management of all techniques used in ophthalmic surgery. Anesthetic procedures and management used in ophthalmic surgery play an important role in the safety and success of surgery [1].

Since the 1980s, anesthesiologists have been increasingly involved in ophthalmic nerve blocks previously performed by surgeons. However, because there are not enough anesthesiologists in some countries, surgeons perform the nerve block themselves. In some countries, anesthesiologists are only responsible for perioperative anesthesiologic care, as the surgeon himself performs the ophthalmic nerve block. In many developed countries (e.g., France and Australia), anesthesiologists are often responsible for administering ophthalmic nerve blocks. The same is true in the United Kingdom. However, recent cost constraints have forced health care leaders to reconsider the role of the anesthesiologist in elective ophthalmic procedures that do not require general anesthesia. Currently, there are no data to support or refute the idea that it is safer for this patient population to have ophthalmic nerve block performed by an anesthesiologist instead of a surgeon, or even to involve an anesthesiologist [2].

Today, it is common practice to provide peroperative care by an anesthesiologist after the ophthalmologist has applied ophthalmic nerve blocks. This is observed because many anesthesiologists consider themselves inadequately trained in ophthalmic block techniques. Less than 25% of anesthesiology residency programs provide hands-on clinical training in ophthalmic regional anesthesia [3]. Anesthesiologists avoid performing ophthalmic blocks because of the potential risk of perforation of the eyeball and damage to muscles and optic nerves [4].

The question arises: "Who should perform ophthalmic blocks?" in the literature. The answer to this question continues to be sought. We conducted a national survey to evaluate the attitudes and knowledge of anesthesiologists involved in regional anesthesia in Turkey about the regional anesthetic procedures used in ophthalmic surgery.

Material and Methods

Ethical approval was granted by the Medipol University Faculty of Medicine Clinical Research Ethics Committee with the decision of the Ethics Committee dated 10/12/2020 and number 886.

For our survey study, questions were prepared using the technique of multiple-choice questions and a five-choice Likert-type scale. Care was taken to ensure that the response options were unbiased and did not influence participants' responses. Private information such as participants' last names, first names, and the name of the institution was not requested. An informational letter about the purpose and nature of the survey was given to participants in the introductory section of the survey. In our survey, participants were asked a total of 23 questions, 5 of which were related to demographic data. The first five questions were questions about age, gender, health

facility, and title information to assess demographic data. Other questions were asked to assess participants' attitudes and knowledge about regional anesthesia procedures used in ophthalmic surgery.

It was determined that the Web-based questionnaire (<https://forms.gle/tNdqzXpwdsNiaqoV8>) would close for responses after three weeks. The Regional Anesthesia Association assisted us in informing the specialists who were more interested in regional anesthesia in Turkey and sending the questionnaire to their e-mail addresses. The questionnaires were sent to approximately 526 physicians who were registered members of the Regional Anesthesia Association mail group at the time in question and had an e-mail address, regardless of title and institution.

Statistical analysis

The data obtained were analyzed in a computer environment using the SPSS 22.0 statistical package (SPSS Inc., Chicago IL, USA). Frequency distributions were calculated and shown as n (%).

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

One hundred twenty-six physicians responded to the electronic questionnaire that we shared with the Regional Anesthesia Association postal group, and these responses formed the study population. Looking at the demographics of the study participants, those in the 30-40 age group accounted for 40.5% of all participants. Faculty members accounted for 60%, those with more than 20 years of experience accounted for 28.5%, and those working at the university hospital accounted for 59.5% (Table 1).

In the anesthesia training and experience questions, the time spent on ophthalmic surgery was found to be 54.8% in those with > 3 months. The rate of use of peribulbar, subtenonal, and retrobulbar blocks was quite low in the group of physicians who participated in the study, and the subconjunctival block was never used by participants. Physicians involved in regional anesthesia reported that they were observers in 68% of ocular block applications (Table 1).

In the questions asked about theoretical training and seminar topics in anesthesia specialization training, 76.2% answered "no" to the question of whether you attended lectures/seminars, etc., on regional block applications in ophthalmic surgery. At the national congresses, the attendance rate for the session on the regional block in ophthalmic surgery was 15%. 48% of participants answered the question that sessions on regional blocks in ophthalmic surgery should be included in national congresses (Table 2).

To the questions asked about clinical functioning and perioperative management: "Who applies regional anesthetic blocks in ophthalmic surgery at your institution?" 95.2% of respondents answered that ophthalmic surgeons perform the blocks. "Have you been asked by ophthalmic surgeons to perform a block?" All participants answered "no" to this question. When asked who should perform the eye blocks, 59.5% of participants responded that they should be performed by ophthalmic surgeons. Responses to the questions about monitorization and

Table 1. Demographic Data and Anesthesia training period and experience.

Demographic Data		n (%)
Age (year)	25-30	12 (9,5%)
	30-40	51 (40,5%)
	40-50	36 (28,6%)
	>50	27 (21,4%)
Gender	Female	51 (40,5%)
	Male	75 (59,5%)
Degree	Resident physician	24 (19%)
	Specialist	39 (31%)
	Assistant professor	63 (60%)
Professional experience (years)	0-5	33 (26,2%)
	5.10	18 (14,3%)
	10.20	39 (31%)
	>20	36 (28,5%)
Institution of employment	State Hospital	21 (16,7%)
	Training and Research Hospital	24 (19%)
	University Hospital	75 (59,5%)
	Private Hospital	6 (4,8%)
	Ophthalmology branch hospital	-
Institution of specialization	Training and Research Hospital	45 (64,3%)
	University Hospital	81 (35,7%)
Anesthesia training period and experience		n (%)
How long did you rotate on the ophthalmic surgery table?	2 months	21 (16,7%)
	3 month	36 (28,6%)
	>3 months	69 (54,8%)
Have you applied peribulbar block?	Yes	3 (2,4%)
	No	123 (97,6%)
Have you applied a subtenon (episcleral) block?	Yes	3 (2,4%)
	No	123 (97,6%)
Have you applied retrobulbar block?	Yes	3 (2,4%)
	No	123 (97,6%)
Have you applied a subconjunctival block?	Yes	0 (0%)
	No	126 (100%)
Have you been an observer while applying regional block in ophthalmic surgery?	Yes	86 (68,3%)
	No	40 (31,7%)
Have you encountered any complications after regional blockade in ophthalmic surgery in your anesthesia training?	Yes	18 (14,6%)
	No	108 (85,4%)

*: Values are expressed as frequency (%).

sedation of patients undergoing regional anesthetic block in ophthalmic surgery are shown in detail in Table 2.

The answers to the Likert-type questions regarding the level of knowledge about anatomy, physiology, pharmacology, appropriate indications, and complications of ophthalmic regional anesthesia are shown in Table 3.

Discussion

In our study, it was found that the majority of participants almost never performed ophthalmic blocks and they considered their own level of knowledge about anatomy, physiology, pharmacology, appropriate surgical indications, and complications related to these blocks to be inadequate. The rotation period was defined

Table 2. Theoretical training, seminar, congress information, perioperative management in the clinic.

Clinical knowledge of ophthalmic blocks n (%)	Absolutely agree	Agree	Undecided	Do not agree	Absolutely do not agree
I have enough knowledge about ophthalmic anatomy to perform regional block	3 (2,4%)	3 (2,4%)	33 (26,2%)	36 (28,6%)	51 (40,5%)
I have sufficient knowledge about ophthalmic physiology and changes that occur with regional block	6 (4,8%)	21 (16,7%)	27 (21,4%)	27 (21,4%)	45 (35,7%)
I have sufficient knowledge about ophthalmic pharmacology, drugs used in regional blockade and their side effects	24 (19%)	27 (21,4%)	21 (16,7%)	21 (16%)	33 (26,2%)
I have sufficient knowledge about the selection of blocks to be performed in the appropriate indication in ophthalmic surgery	-	9 (7,1%)	39 (31%)	39 (31%)	39 (31%)
I have sufficient knowledge about the specific complications associated with appropriately performing blocks in ophthalmic surgery	6 (4,8%)	27 (21,4%)	24 (21,4%)	39 (31%)	30 (23,8%)

*: Values are expressed as frequency (%).

Table 3. Clinical knowledge of ophthalmic blocks.

Theoretical training, seminar, congress information	n (%)
Have you attended lectures/seminars etc. on regional block applications in ophthalmic surgery at your clinic's seminars?	Yes 30 (23,8%)
	No 96 (76,2%)
Have you attended sessions, etc. at national congresses on the topic of regional block in ophthalmic surgery?	Yes 18 (15%)
	No 108 (85%)
Should sessions on regional block applications in ophthalmic surgery be included in national congresses?	Yes 42 (33,3%)
	No idea 36 (28,6%)
	No 48 (38,1%)
Perioperative management in the clinic	n (%)
Who performs regional anesthetic blocks in ophthalmic surgery at your institution?	Anesthetist 6 (4,8%)
	Ophthalmic surgeon 120 (95,2%)
Have you been requested to make a block from ophthalmic surgeons in your institution?	Yes 0 (0%)
	No 126 (100%)
Who do you think should do regional anesthetic blocks in ophthalmic surgery?	Anesthetist 51 (40,5%)
	Ophthalmic surgeon 75 (59,5%)
Is monitorized follow-up performed for patients who have undergone regional anesthetic block in ophthalmic surgery?	Yes 66 (52,4%)
	No 30 (23,8%)
	No idea 30 (23,8%)
Is sedative follow-up performed in patients who have undergone regional anesthetic block in ophthalmic surgery?	Yes 33 (26,2%)
	No 45 (35,7%)
	No idea 48 (38,1%)
Do you take a primary role in the management of local anesthetic-related complications after regional block in ophthalmic surgery in your clinic?	Yes 45 (35,7%)
	No 69 (54,8%)
	No idea 12 (9,5%)

*: Values are expressed as frequency (%).

as anesthesia (2 months) in ophthalmic surgery, according to the Core Curriculum of the Residency Committee Curriculum and Standard System, Anesthesia and Resuscitation Training in Residency; the degree of competence in anesthesia for intraocular surgery was defined as 4 (expresses the degree of ability to perform the procedure in all types of cases, whether it is complex or not). However, this article does not report the degree of competence specifically for eye blocks. Looking at the results of our study, all participants completed the appropriate rotations. However, since the anesthesiologist is not responsible for the implementation and follow-up of these blocks in the hospitals, we can conclude that the participants feel inadequate in terms of clinical practice and knowledge level.

Anesthesiologists are theoretically best suited to perform nerve blocks, provide monitored patient care, and manage life-threatening complications. Anesthesiologists have demonstrated the ability to perform eye blocks like other regional anesthetic techniques when properly trained [5]. Furthermore, "who should perform these blocks?" the answer to the question "This should be performed by ophthalmologists" was given. Although this situation places the responsibility for performing the block on the surgeon, it does not relieve the anesthesiologist of the responsibility to recognize and manage the complications associated with the technique used. Participants reported insufficient knowledge of anatomy, physiology, pharmacology, specific indications, and complication management associated with blocks in ophthalmic surgery. Therefore, anesthesiologists in the responses in the study did not tend to share responsibility for the use of ocular blockade to a high degree with the surgeon.

Ophthalmologic local anesthesia dates back to the time of Koller and Knapp. They described local anesthesia and early retrobulbar block surgery with 5% cocaine. Since then, local anesthesia for ophthalmic surgery has undergone several changes, including retrobulbar, peribulbar, sub-tenon, subconjunctival, deep fornix and topical anesthesia. [6]. Lack of training and education seem to be the main reasons why anesthesiologists do not want to use these techniques.

Both intraocular procedures and extraocular procedures can be performed under local anesthesia, but anesthetic techniques vary. For other ophthalmic surgical procedures that require complete anesthesia and immobility, an injection technique such as peribulbar or retrobulbar block or sub-Tenon block is required. Although the sub-tenon block is gaining popularity and is widely used in certain parts of the world, the retrobulbar block remains the most commonly practiced technique in many developed and developing countries [1].

In 1934, Atkinson [7] described the classic retrobulbar block, in which patients look upward and inward. It is administered by injecting 2 to 3 ml of local anesthetic very close to the optic nerve. Akinesia and analgesia are achieved quickly, but blockade of the facial nerve is required for blockade of the orbicularis oculi muscle. Both retrobulbar and facial nerve blocks are associated with significant complications, and the technique has recently been modified [8].

In modern retrobulbar block, topical anesthesia (oxybuprocaine or similar eye drops) is required for perconjunctival injection. Four-five ml of local anesthetic is injected with the needle

pointing upward and inward, but tangential to the globe. Separate facial nerve block is not required [9]. Peribulbar block has been established as an alternative to retrobulbar block. Here, 5 to 6 ml of local anesthetic is injected outside the muscle cone. The technique is essentially very similar to the retrobulbar block, except that the needle is not directed upward and inward [10].

In the sub-Tenon's block technique, the local anesthetic is injected between the Tenon's capsule and the sclera with a blunt cannula. This block is also known as parabolbar block, pin-point anesthesia, and episcleral block. A lower Tenon needle is inserted carefully along the curve of the eyeball; never use excessive force. The injected local anesthetic (4 to 5 ml) is diffused into and around the intraconal space. Anesthesia and immobility are achieved with this application. Sub-tenon blockade has been reported to have complications similar to other blockades [11].

2% lidocaine provides rapid, intense sensory and motor blockade, and the duration of action is usually sufficient to perform cataract surgery. On the other hand, 0.5% bupivacaine can be used for longer procedures such as vitreo-retinal surgery because it has a longer duration of action. [12, 13]. Retrobulbar, peribulbar and sub-Tenon's blockade with Hyaluronidase have been shown to shorten the insertion time and improve its quality [10].

If we look at systemic complications due to ophthalmic blocks, toxicity of local anesthetics and vasovagal reactions are the most common systemic complications associated with local anesthesia. Hyaluronidase, an adjuvant used to improve block formation and quality, can rarely cause allergic reactions [14]. Accidental intra-arterial injection of local anesthetic for brainstem anesthesia may result in retrograde flow of the anesthetic from the ophthalmic artery into the cerebral artery or internal carotid artery, leading to injection of the anesthetic into the central nervous system. Signs and symptoms include severe tremor, contralateral vision loss, unconsciousness, apnea, hemiplegia or quadriplegia [15].

Blockage of the eighth to twelfth cranial nerves results in deafness, tinnitus, vertigo, dysarthria, dysphagia, and aphasia. These symptoms are prominent manifestations of the spread of local anesthetic into the cerebrospinal fluid, but may occur in combinations with different clinical manifestations, and the anesthesiologist should be alert and prepared to perform cardiopulmonary resuscitation [16, 17]. Most of the participants reported that they had no role in complication management and that they experienced low rates of complications during the procedures for which they were present as observers.

Therefore, careful selection and monitoring of patients is important. Monitoring should begin before blockade is applied and continue until the surgical procedure is completed. Probably the most important monitoring is the communication with an anesthesiologist who is in constant contact with the patient. Patient's hand can be held for communication and reassurance. Pulse oximetry, electrocardiogram, and noninvasive blood pressure monitoring are sufficient for most procedures [18, 19]. With careful patient selection, information, patient-doctor trust, and a compassionate approach, most patients accept ophthalmic surgery under local anesthesia. Although there

are participants who are unaware of hospital practices for monitoring and follow-up of patients who have undergone regional anesthesia in ophthalmic surgery, monitoring is generally performed, but sedation has been observed to be performed to a lesser extent [20,21].

The limitations of our study: due to the current pandemic conditions, the sample size could be larger for face-to-face congresses and symposia with high attendance. In addition, we think it would be more appropriate to contact the Association of Ophthalmologists and conduct descriptive or comparative studies with a larger number of participants on both groups of physicians. In addition, we believe that the heavy workload that the pandemic brought to anesthesiologists may have imposed a limitation on their experience with these regional techniques through direct observation and the expansion of knowledge through their applied training.

Conclusions

Even among the group of anesthesiologists involved in regional anesthesia, the lack of theoretical knowledge and practical application in ophthalmic nerve blocks is striking. Awareness and knowledge of these blocks can be improved through in-clinic seminars, theoretical courses, practical block applications on cadavers, and congresses, or these applications should continue to be performed exclusively by ophthalmologists as a continuation of the current practice in our country. However, the main responsibility of the anesthesiologist cannot be ignored when it comes to the management of complications that may occur even if the surgeon performs the nerve block. Therefore, even if it is not self-applying, the goal should be to increase the basic level of knowledge regarding the block technique, the field of application, and possible complications and mechanisms.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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